

PATENT SPECIFICATION

694,386

Inventor :—CHARLES SAMUEL ROBERT STOCK.



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COMPLETE SPECIFICATION.

Improvements in or relating to Vehicle Suspension.

We, GIRLING LIMITED, a British Company, of Kings Road, Tyseley, Birmingham 11, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in vehicle suspension and relates particularly to suspension employing road springs of the leaf type.

On modern vehicles the suspension is considerably more flexible than on older vehicles and it is desirable to provide some means interconnecting the springing on opposite sides of the vehicle to limit the tendency of the body or other sprung mass to roll or sway when the vehicle is changing direction.

In one known arrangement where lever-operated dampers are employed an anti-roll bar has been connected between the operating shafts of the dampers at opposite sides of the chassis, and while this is a simple and economical arrangement it can only be used with dampers of that type and it means that the resisting force of the anti-roll bar is applied through the damper bearings and the bolts securing the dampers to the chassis.

According to our invention, in a vehicle having road springs of the leaf type a transversely extending anti-roll torsion bar is formed at its ends with portions which extend longitudinally of the vehicle and are secured directly to the road springs themselves.

The central transverse portion of the bar is preferably substantially in line with the fixed eyes of the springs so that there are no bending forces on the bar, but this is not essential and the bar can be mounted in a different position without affecting its functioning.

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If the springs are shackled at one end the bar may be mounted at that end but in that case there will always be some bending of the bar.

The central transverse portion of the bar need not be straight throughout its length but can be set or joggled to clear parts of the chassis.

As the forces in the spring system are self-contained a minimum number of parts are stressed in resisting roll and considerable latitude in the location of the bar is possible so that the bar can readily be arranged to miss obstructions on the chassis.

Each longitudinally extending part of the bar may be attached to the top, bottom or side of a spring and it may be secured to the spring at two longitudinally spaced points, the bar being mounted in rubber bushes in clips secured round the spring. The rubber bushes provide sufficient flexibility to take care of any distortion likely to occur.

Some practical forms of our invention are illustrated by way of example in the accompanying drawings in which:—

Figure 1 is a perspective view of a vehicle axle and the associated leaf springs fitted with our improved anti-roll torsion bar.

Figure 2 is a side elevation of one end of a spring and of the torsion bar showing the location of the anchorage clips.

Figures 3 and 4 are fragmentary plans showing other locations of the torsion bar.

In the construction shown in Figures 1 and 2 *a* represents the axle of a vehicle to which are secured by the usual U bolts *b* two parallel laminated leaf springs *c*, *c* for supporting the vehicle body. An anti-roll torsion bar *d* is arranged transversely substantially in alignment with the eyes *e*, *e* at one end of the springs. The ends *f*, *f* of the bar are cranked to extend longitudinally.

Fig 4a 63

ally over the springs and each is mounted in rubber bushes *g* which are held in spaced clips *h* secured to the spring. Each clip is of inverted U shape fitting downwardly over the spring leaves and is positively located by a bolt *j* passing through the limbs of the clip and through an eye *k* formed by curling round the end of one of the shorter spring leaves. The part of the clip above the spring in which the rubber bush is mounted may be of reduced width as shown.

There is an intermediate cranking *l* between the transverse central part of the bar and the longitudinally extending end parts *f* to allow the bar to clear the main spring eyes *e*.

In the arrangement shown in Figure 3 the transverse torsion bar *m* instead of being located at the outer end of the springs is located adjacent to the axle *n*. At each side the bar is mounted in a rubber bush *p* in a lug *q* fixed to the axle or spring pad and lying just above the spring. The part *r* of the bar outside the spring is cranked to extend longitudinally parallel to the spring and then is cranked inwardly again and its end is mounted in a rubber bush *s* held in a clip *t* fixed to the spring at a point spaced from the axle.

In the arrangement shown in Figure 4 the central part of the transverse torsion bar *u* is mounted adjacent to each end in a rubber bush in a lug *v* fixed to the axle on the inner side of the spring. The end of the bar is cranked outwardly to bring it into alignment with the spring and its extremity *w* which is parallel to the spring is mounted in a rubber bush in a clip *x* fixed to the spring at a point spaced from the axle.

What we claim is:—

1. Vehicle suspension incorporating road springs of the leaf type in which a transversely extending anti-roll torsion bar is formed at its ends with portions which extend

longitudinally of the vehicle and are secured directly to the road springs themselves.

2. Vehicle suspension incorporating road springs of the leaf type in which a transversely extending anti-roll torsion bar is arranged substantially in line with the eyes of the springs at one end and the ends of the bar are cranked to extend longitudinally parallel to the springs to which they are directly secured at spaced points.

3. Vehicle suspension incorporating road springs of the leaf type in which a transversely extending anti-roll torsion bar is located adjacent to the axle and is mounted in rubber bushes in lugs on the axle or spring pads adjacent to the springs and the ends of the bar are cranked longitudinally to extend parallel to the springs to which they are secured at points spaced from the axle.

4. Vehicle suspension as claimed in Claim 2 in which each end of the bar is held in rubber bushes in spaced clips secured to the spring.

5. Vehicle suspension as claimed in Claim 4 in which each clip is of inverted U shape fitting downwardly over the spring leaves and is located by a bolt passing through the limbs of the clip and through an eye formed by curling round the end of one of the shorter spring leaves.

6. Vehicle suspension substantially as described with reference to Figures 1 and 2 of the accompanying drawings.

7. Vehicle suspension substantially as described with reference to Figure 3 of the accompanying drawings.

8. Vehicle suspension substantially as described with reference to Figure 4 of the accompanying drawings.

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PROVISIONAL SPECIFICATION.

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On modern vehicles the suspension is considerably more flexible than on older vehicles and it is desirable to provide some means interconnecting the springing on opposite sides of the vehicle to limit the tendency of the body or other spring mass

to roll or sway when the vehicle is changing direction.

In one known arrangement where lever-operated dampers are employed an anti-roll bar has been connected between the operating shafts of the dampers at opposite sides of the chassis, and while this is a simple and economical arrangement it can only be used with dampers of that type and it means that the resisting force of the anti-roll bar is applied through the damper bearings and the bolts securing the dampers to the chassis.

According to our invention, in a vehicle

5 having road springs of the leaf type a transverse anti-roll torsion bar is formed at its ends with cranked longitudinally extending portions which are secured directly to the road springs themselves.

10 The central transverse portion of the bar is preferably in line with the fixed eyes of the springs so that there are no bending forces on the bar, but this is not essential and the bar can be mounted in a different position without affecting its functioning.

15 If the springs are shackled at one end the bar may be mounted at that end but in that case there will always be some bending of the bar.

The central transverse portion of the bar need not be straight throughout its length but can be set or joggled to clear parts of the chassis.

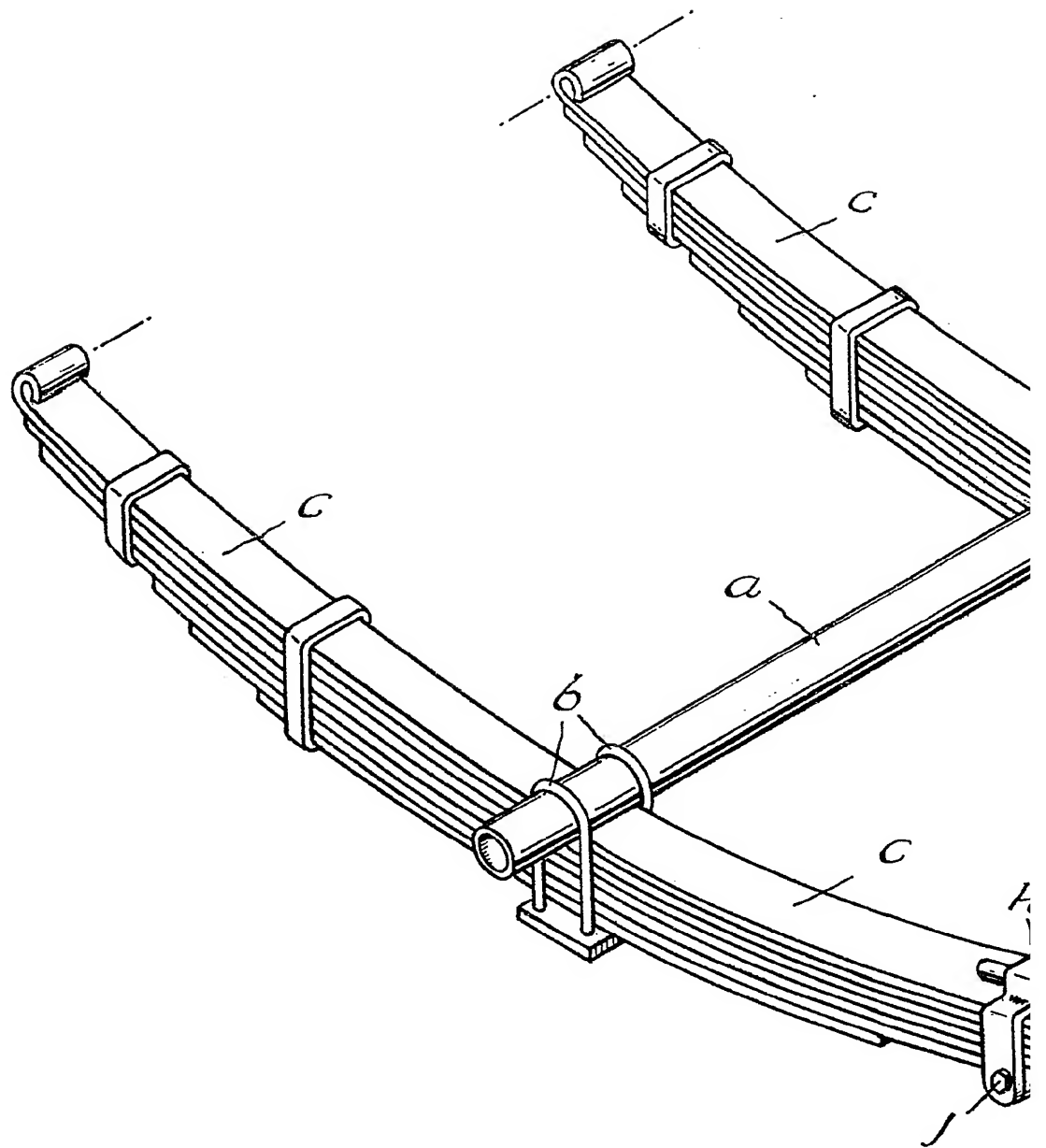
20 As the forces in the spring system are self-contained a minimum number of parts are stressed in resisting roll and considerable latitude in the location of the bar is possible

so that the bar can readily be arranged to miss obstructions on the chassis. 25

Each longitudinally extending part of the bar may be attached to the top, bottom or side of a spring. If it is attached to the top or bottom there is no twisting effect on the spring but it is preferred to make the attachment to the inner side of the spring as the resisting force of the torsion bar will then be opposite to and will tend to correct the twist on the spring caused by roll. 30

Preferably each longitudinally extending part of the bar is secured to the spring at two longitudinally spaced points, the bar being mounted in rubber bushes in lugs on the inner side of clips secured round the spring. The rubber bushes provide sufficient flexibility to take care of any distortion likely to occur. 35 40

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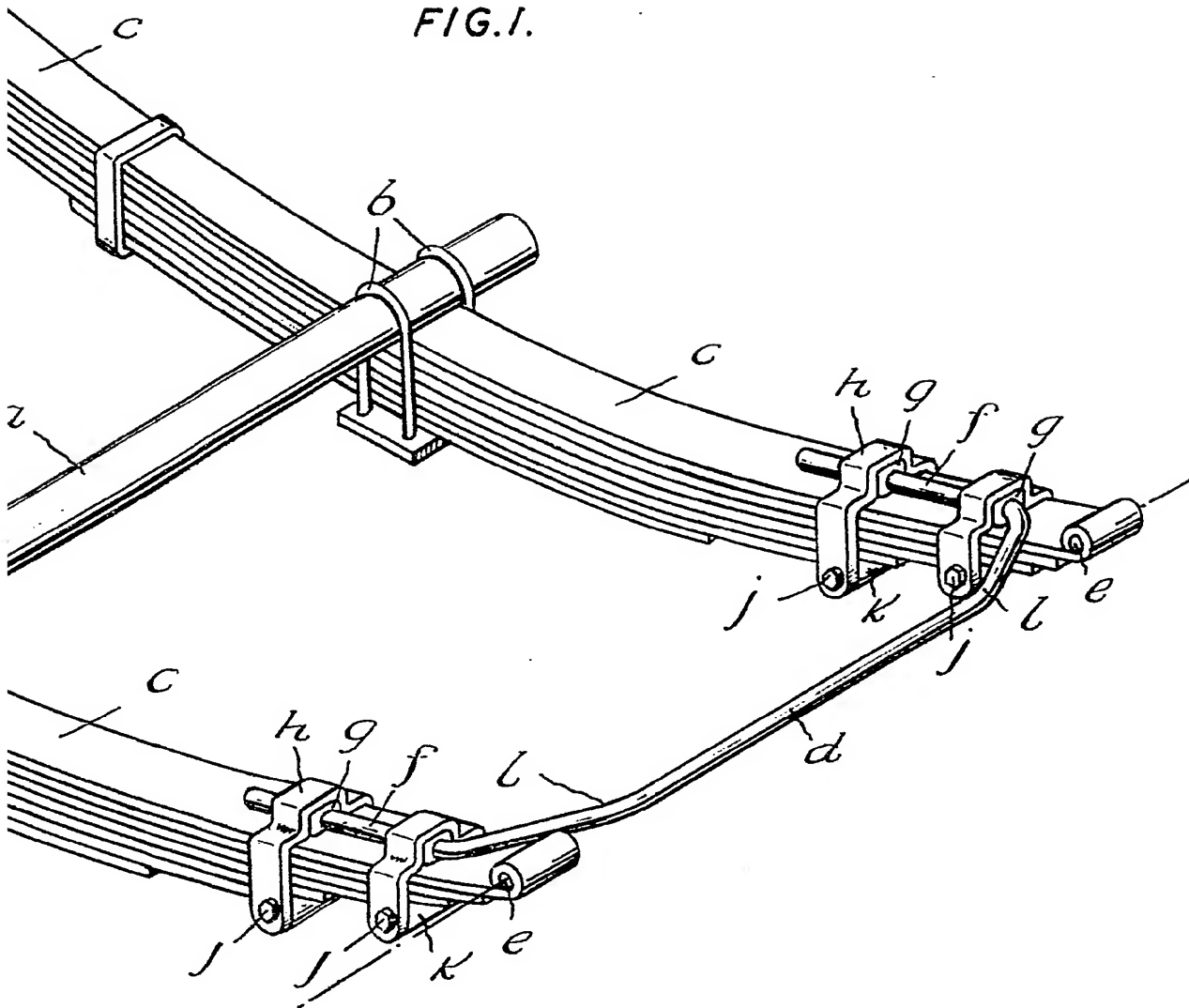
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2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale.

SHEET 1

FIG. 1.



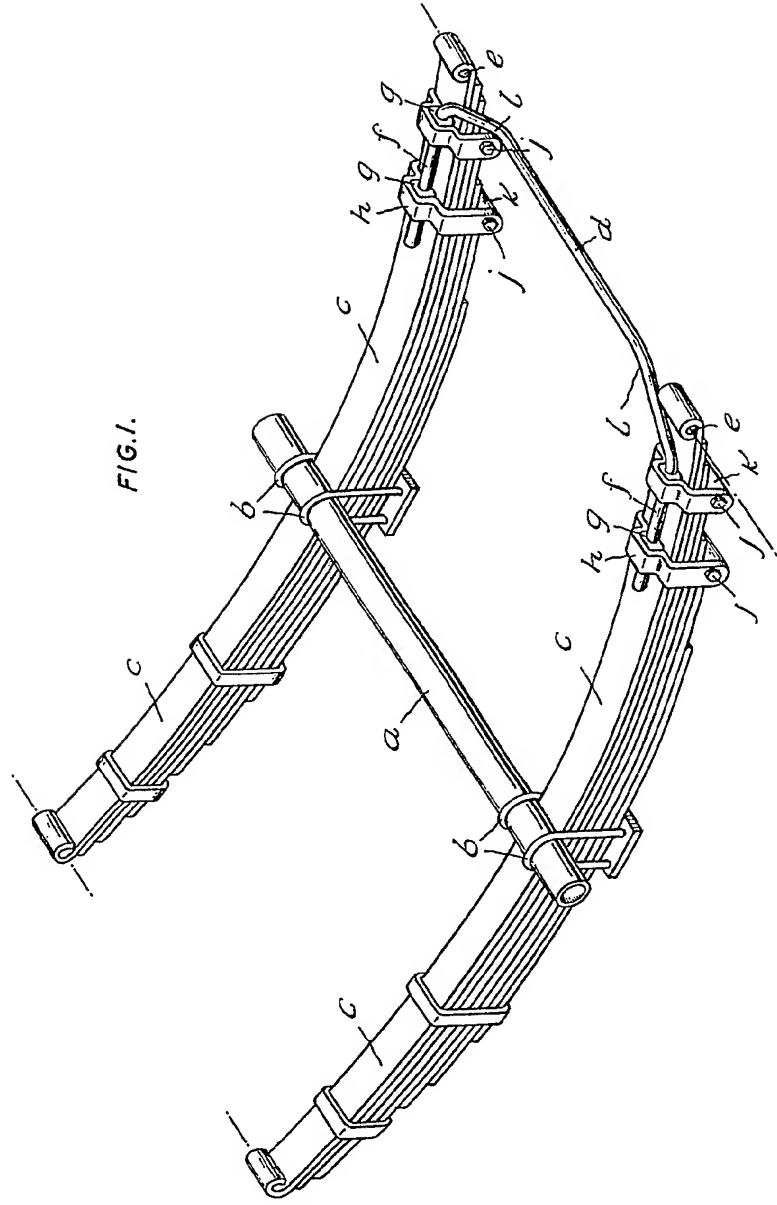


FIG. 2.

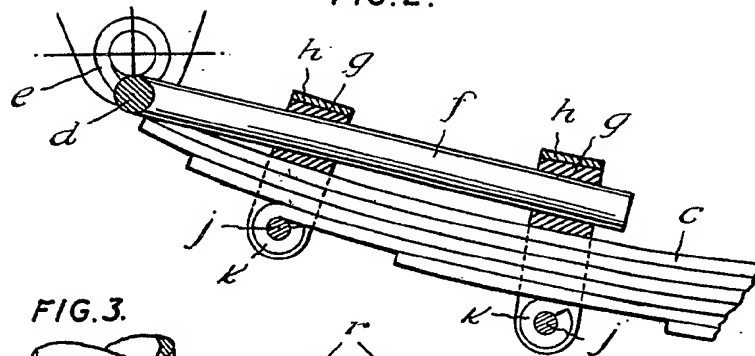


FIG. 3.

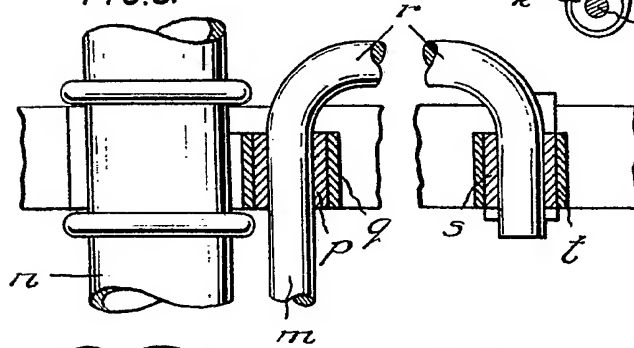


FIG. 4.

